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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/614,255
Filing Date: July 03, 2003
Appellant(s): EUBANKS, MARY WILKES

Mary Wilkes Eubanks
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed January 21, 2009 appealing from the Office action mailed November 14, 2008.

The appeal brief is filed in the new format under the revised BPAI final rule before the effective date of the BPAI final rule. The Office published the BPAI final rule to amend the rules governing practice before the BPAI in *ex parte* patent appeals. *See Rules of Practice Before the Board of Patent Appeals and Interferences in Ex Parte Appeals; Final Rule, 73 FR 32938 (June 10, 2008), 1332 Off. Gaz. Pat. Office 47 (July 1, 2008).* However, the effective date fro the BPAI final rule has been delayed. *See Rules of Practice Before the Board of Patent Appeals and Interferences in Ex Parte Appeals; Delay of Effective and Applicability Dates, 73 FR 74972 (December 10, 2008).* In the notice published on November 20, 2008, the Office indicated that the Office will not hold an appeal brief as non-compliant solely for following the new format even though it is filed before the effective date. *See Clarification of the Effective Date Provision in the Final Rule for Ex Parte Appeals, 73 FR 70282 (November 20, 2008).* Since the appeal brief is otherwise acceptable, the Office has accepted the appeal brief filed by appellant.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The statement of the status of claims contained in the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

Eubanks, US Patent No. 5,330,547, July 19, 1994

Eubanks, Theor Appl Genet 94: 707-712, 1997

Eubanks, US Patent No. PP 7,977, September 15, 1992

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Ground (1):

Claims 44-70 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Eubanks (U.S. Patent No. 5,330,547, July 19, 1994), in view of Eubanks (Theor Appl Genet 94: 707-712, 1997).

The claims read on a maize plant comprising one or more restriction fragments wherein said maize plant is produced by cross-pollinating a maize plant with either a (Tripsacum x teosinte) plant or a (teosinte x Tripsacum) plant to produce a trigeneric hybrid maize plant and backcrossing said hybrid plant at least once to a maize plant.

The claims are product claims drawn to a maize plant comprising one or more restriction fragments. Restriction fragments are used in plant breeding to identify genes or alleles that are associated with morphological or physiological characteristics. Therefore, the maize plants taught by Eubanks (1994) would possess the same genes or alleles which would be associated with the same restriction fragments as cited in the claimed invention because the maize plant taught by Eubanks (1994) was produced by the same method as the claimed invention (i.e., by crossing a maize plant with a (Tripsacum x teosinte) plant).

Eubanks (1994) teaches a maize plant produced by crossing a maize plant with a (teosinte x Tripsacum) plant (see, for example, column 3, line 64 to column 4, line 2, where it teaches "*Zea diploperennis* [i.e. teosinte] and *Tripsacum dactyloides* have been crossed to produce a novel hybrid referred to as Tripsacorn…[a] bridging mechanism to transfer *Tripsacum* genes into maize is provided by Tripsacorn which is cross-fertile with maize [and] promises to improve corn by imparting numerous beneficial characteristics including pest resistance and drought tolerance") and backcrossing (see, for example, column 2, lines 30-34, where it teaches "introgression of Tripsacum genetic material into maize...has required years of complicated, high risk breeding programs that involve many backcross generations to stabilize desirable Tripsacum genes in maize". One of

ordinary skill in the art would have appreciated that trigeneric hybrid plants can be backcrossed at least once to a maize plant and, in addition, would understand that such a backcross would stabilize desirable Tripsacum genes as taught by Eubanks.).

Eubanks (1994) does not teach one or more restriction fragments; however, the maize plants taught by Eubanks (1994) were produced by the same method as the claimed invention (i.e., by crossing a maize plant with a (Tripsacum x teosinte) plant). Eubanks (1997) teaches one or more restriction fragments (see, for example, page 780, 2nd column, 1st full paragraph where it teaches "[m]apping experiments combining…QTLs and molecular marker loci…have identified over 50 restriction fragment length polymorphisms (RFLPs) that distinguish advanced maize from its putative ancestor, annual teosinte". Also, see, for example, page 709, Table 1 where it teaches markers used to characterize Tripsacum x teosinte hybrids).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicant's invention to combine the above teachings to produce the claimed invention.

One of ordinary skill in the art would have been motivated to combine these teachings because Eubanks (1994) teaches "[t]he limited fertility of maize-Tripsacum hybrids presents a significant biological barrier to gene flow between these species…and [a]n effective procedure to transfer Tripsacum germplasm into maize has been needed by maize breeders and geneticists for many years (see column 2, lines 28-40). In addition, Eubanks (1994) teaches maize plants produced by crossing a maize plant with a (Tripsacum x teosinte) plant.

In addition, one of ordinary skill in the art would have reasonable expectation of success based on the success of Eubanks (1994) in crossing Tripsacorn with maize (see, for example, column 3, line 64 to column 4, line 3, where it teaches "[a] bridging mechanism to transfer *Tripsacum* genes into maize is provided by Tripsacorn which is cross-fertile with maize").

Ground 2:

Claims 44-70 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Eubanks (U.S. Patent No. PP7,977, September 15, 1992), in view of Eubanks (Theor Appl Genet 94: 707-712, 1997). The claims read on a maize plant comprising one or more restriction fragments wherein said maize plant is produced by cross pollinating a maize plant with either a (Tripsacum x teosinte) plant or a (teosinte x Tripsacum) plant to produce a trigeneric hybrid maize plant and backcrossing said hybrid plant at least once to a maize plant.

Eubanks (1992) teaches a maize plant produced by crossing a maize plant with a (teosinte x Tripsacum) plant (see, for example, column 2, lines 14-21, where it teaches "Tripsacorn evidently provides a natural bridge for introducing Tripsacum germ plasm into corn…[t]he results of crossing Tripsacorn…to corn were distinctly different from the results of crossing the patented plant Sun Dance…to corn". One of ordinary skill in the art would understand that this teaches that maize can be crossed with Tripsacum x teosinte plants because as discussed above Tripsacorn is produced from a cross from Tripsacum x teosinte) and backcrossing (see, for example, column 2, lines 9-11, where it teaches "[i]n preliminary field trials of backcrosses to a commercial corn line, drought

tolerance and enhanced pest resistance were observed in the F1 generation". One of ordinary skill in the art would appreciate that trigeneric hybrid plants can be backcrossed at least once to a maize plant.).

Eubanks (1992) does not teach one or more restriction fragments.

Eubanks (1997) teaches one or more restriction fragments (see, for example, page 780, 2nd column, 1st full paragraph where it teaches "[m]apping experiments combining…QTLs and molecular marker loci…have identified over 50 restriction fragment length polymorphisms (RFLPs) that distinguish advanced maize from its putative ancestor, annual teosinte". Also, see, for example, page 709, Table 1 where it teaches markers used to characterize Tripsacum x teosinte hybrids).

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicant's invention to combine the above teachings to produce the claimed invention.

One of ordinary skill in the art would have been motivated to combine these teachings because Eubanks (1992) teaches "Tripsacorn…provides a natural bridge for introducing Tripsacum germ plasm into corn" (see column 2, lines 14-15).

In addition, one of ordinary skill in the art would have reasonable expectation of success based on the success of Eubanks (1992) in crossing Tripsacorn with corn (see, for example, column 2, lines 18-21 where it teaches "[t]he results of crossing Tripsacorn…to corn were distinctly different from the results of crossing the patented plant Sun Dance…to corn". In addition, Eubanks (1992) teaches maize plants produced by crossing a maize plant with a (Tripsacum x teosinte) plant.

(10) Response to Arguments

Regarding the STATEMENT OF FACTS on pages 5-14 of the appeal brief, the Examiner has the following comments:

Regarding page 6, lines 9-12, Appellant states that the Examiner did not indicate the status of claim 23. It is noted that claim 23 was allowed in the Office Action mailed September 4, 2007.

Claims 44-70 are Nonobvious over the '547 Patent and Eubanks

a. Scope and content of the prior art.

Appellant argues that the Examiner has provided no weight to the fact that the author/inventor of the cited references is the Appellant. See page 17, 2nd paragraph of appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

The fact that Appellant is the author/inventor of the cited references is irrelevant because the cited references were published more than one year before the effective filing date of the instant application.

See MPEP 2141.01 (I) where it teaches "[a] 35 U.S.C. 103 rejection is based on 35 U.S.C. 102(a), 102(b), 102(e), etc. depending on the type of prior art reference used

and its publication or issue date. For instance, an obviousness rejection over a U.S. patent which was issued more than 1 year before the filing date of the application is said to be a statutory bar just as if it anticipated the claims under 35 U.S.C. 102(b)".

Thus, the Examiner has not provided any weight to the fact that Appellant is the author/inventor of the cited references because the cited references were issued more than one year before the filing date of the application.

Appellant argues that the claimed hybrid maize plants were not contemplated at the time the application was filed because it was believed that the *Tripsacum* genes would be lost in the backcrosses rather than stably inherited in successive generations. See page 17, last paragraph to page 18, line 2 of the appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

It is noted that the claimed invention is not drawn to a hybrid maize plant but rather a maize plant comprising one or more restriction fragments wherein said maize plant was produced by crossing a maize plant with a (*Tripsacum* x teosinte) plant to produce a trigeneric hybrid maize plant and backcrossing said trigeneric hybrid maize plant at least once to a maize plant.

Eubanks (1994) teaches a maize plant that was produced by crossing maize with a (teosinte x Tripsacum) plant. See, for example, column 3, line 64 to column 4, line 2, where it teaches "*Zea diploperennis* [i.e. teosinte] and *Tripsacum dactyloides* have been crossed to produce a novel hybrid referred to as Tripsacorn…[a] bridging mechanism to

transfer *Tripsacum* genes into maize is provided by Tripsacorn which is cross-fertile with maize [and] promises to improve corn by imparting numerous beneficial characteristics including pest resistance and drought tolerance". Also, see, for example, column 11, lines 50-68 and column 13, Table 1 where it teaches maize x Tripsacorn (wherein Tripsacorn is produced by crossing teosinte x Tripsacum, as discussed above) plants.

Thus, Eubanks (1994) teaches the trigeneric hybrid maize plants produced by crossing a maize female plant with either a Tripsacum-teosinte male plant or a teosinte-Tripsacum male plant and it would have been obvious to one of ordinary skill in the art that such a trigeneric maize plant would have been able to be backcrossed with a maize plant because Eubanks (1994) teaches that Tripsacum genetic material can be backcrossed into maize. See column 2, lines 30-34. It would have been obvious to one of ordinary skill in the art that the trigeneric maize hybrid has Tripsacum genetic material, as Tripsacum is used as one of the three parents in the cross.

b. Differences between the prior art and the claims at issue.

Appellant argues that the Examiner has yet to address how the claimed plants and their restriction fragments could have been reasonably predicted prior to their creation and the art had difficulties in introgressing *Tripsacum* genetic material into maize. See page 18, 2nd paragraph to page 19, line 2 of the appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

It should be noted that restriction fragments are not passed from one plant to another, but rather it is the plant's genes that are transferred from one plant to another. The restriction fragments are simply markers that are used to identify genes in the genome of a plant; thus, one of ordinary skill in the art would not predict restriction fragments, but would use restriction fragments to identify genes in the plant's genome. Therefore, the claimed restriction fragments would be produced in any trigeneric hybrid that was derived from crossing a maize plant with a (*Tripsacum* x teosinte) plant.

The restriction enzymes used to produce the claimed restriction fragments are widely used in the art and it would have been obvious to one of ordinary skill in the art to use these restriction enzymes to produce restriction fragments. See, for example, Eubanks (1997) which teaches screening plants for the presence of one or more restriction fragments. See, for example, page 708, 2nd column, 1st full paragraph where it teaches "[m]apping experiments combining…QTLs and molecular marker loci…have identified over 50 restriction fragment length polymorphisms (RFLPs) that distinguish advanced maize from its putative ancestor, annual teosinte". See, page 708, 2nd column, Materials and methods' where it teaches the digestion of genomic DNA with restriction endonucleases *Eco*RI, *Hind*III, *Eco*RV and *Bam*HI. Also, see, for example, page 709, Table 1 where it teaches markers used to characterize Tripsacum x teosinte hybrids.

Thus, the trigeneric plants taught by Eubanks (1994) would obviously have the same or similar restrictions fragments associated with its genome because the

trigeneric plants taught by Eubanks (1994) have the same three parents in its cross (i.e. maize, teosinte and Tripsacum) as the claimed invention. Therefore, one of ordinary skill in the art would have been able to reasonably predict the claimed plants and the use of restriction fragments.

In regard to Appellant's assertion that the art had difficulties in introgressing *Tripsacum* genetic material into maize; it is noted that Eubanks (1994) did not have difficulty in introgressing *Tripsacum* genetic material into maize. See, for example, column 11, lines 50-68 and column 13, Table 1 where it teaches plants produced by crossing maize x Tripsacorn (wherein Tripsacorn is produced by crossing teosinte x Tripsacum, as discussed above).

The specification teaches that *Tripsacum* can be used to transfer its germplasm into maize to provide beneficial traits such as heat and drought tolerance and resistance to corn root worm, for example. See, for example, column 2, lines 38-45.

The aforementioned cross produced plants that had enhanced resistance to corn earworm and corn rootworm as well as enhanced resistance to drought stress. See, for example, column 11, 50-68.

Thus, it is apparent and would have been obvious to one of ordinary skill in the art that the plants taught by Eubanks (1994) have introgressions of *Tripsacum* genetic material based on their enhanced insect and drought resistance.

Appellant argues that the art and the application all note that not all crosses between these species are viable and that even if viable may be sterile. See page 19, 1st paragraph of the appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

As discussed above, Eubanks (1994) teaches plants produced by crossing maize x Tripsacorn (wherein Tripsacorn is produced by crossing teosinte x Tripsacum); thus, Eubanks (1994) has taught a trigeneric hybrid and in addition, has taught that said hybrid is viable and fertile. See, for example, column 11, lines 50-68 where it teaches "plants produced by (maize x Tripsacorn) [it is noted that Tripsacorn is produced by crossing teosinte x Tripsacum, as discussed above] do not show as many signs of infestation by insects or disease as maize controls…resistance to aphids and white flies has been observed on plants grown in the greenhouse and enhanced resistance to corn earworm and ear and kernel rot has been observed in plants grown in the field". Thus, it is apparent that Eubanks (1994) has taught that crosses between these species are viable and are indeed fertile instead of sterile.

Appellant argues that the '547 patent (i.e. Eubanks (1994)) does not describe backcrossing a trigeneric plant (maize-*Tripsacum*-teosinte) to a maize or *Tripsacum*-teosinte hybrid. See page 19, last paragraph to page 20, 1st paragraph of the appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

Eubanks (1994) teaches the introgression of Tripsacum genetic material into maize by backcrossing. See, for example column 2, lines 30-34 where it teaches, "introgression of Tripsacum genetic material into maize...has required years of complicated, high risk breeding programs that involve many backcross generations to stabilize desirable Tripsacum genes in maize". In addition, Eubanks (1994) teaches "[p]lant breeding techniques…as described herein are known, and may be carried out in the manner known to those skilled in the art". See column 7, lines 29-31.

Thus, it is known in the art of plant breeding that backcrossing is a means of introgressing genes into a maize plant and Eubanks (1994) has taught that Tripsacum genetic material can be introgressed into maize by backcrossing, as discussed above. Therefore, it would have been obvious to one of ordinary skill in the art to backcross the trigeneric hybrid plant at least once to a maize plant because as taught by Eubanks (1994) backcrossing is used to "stabilize desirable Tripsacum genes in maize", as stated above.

See MPEP 2141(II) (C) where it states, "A person of ordinary skill in the art is also a person of ordinary creativity, not an automaton."KSR, 550 U.S. at ___, 82 USPQ2d at 1397…Office personnel may also take into account "the inferences and creative steps that a person of ordinary skill in the art would employ."Id. at ___, 82 USPQ2d at 1396".

Appellant argues that the '547 patent (i.e. Eubanks (1994)) teaches that maize-*Tripsacum* hybrid backcrossing was unpredictable and given that one or ordinary skill in the art had no way to reliably predict the results of backcrossing a maize-*Tripsacum* hybrid, he or she could not have reliably predicted the results of a more complicated backcross with a trigeneric plant. See page 20, 2nd paragraph to page 21, line 2 of the appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

It is noted that Eubanks (1994) does not teach that maize-*Tripsacum* hybrid backcrossing was unpredictable, but rather that it was complicated and required many backcross generations. See, for example, column 2, lines 30-34. However, the complexity of maize-*Tripsacum* hybrid backcrossing would not prevent one of ordinary skill in the art from backcrossing a trigeneric hybrid at least once to a maize plant because it is known in the art that backcrossing is used to introgress desired genes into a recurrent parent wherein said recurrent parent would retain its own desirable characteristics in addition to having the desired characteristics of the donor parent. This is even reinforced in the teachings of Eubanks (1994) wherein Eubanks (1994) teaches that backcrossing is used to "stabilize desirable Tripsacum genes in maize", as stated above.

d. Relevant secondary considerations.

Appellant argues that (1) strong evidence has been presented with regard to the unexpectedness of the backcross as the art believed that *Tripsacum* genetic material would be lost; (2) the art could not have predicted the surprising number of novel alleles created by the crosses because rather than inheriting an allele from each parent as expected under Mendelian inheritance, the claimed plants have novel alleles formed at precise genetic loci via a recombination of the parental genomes; and (3) the Examiner has not provided any evidence showing that one of ordinary skill in the art could have reasonably predicted the claimed restriction fragments. See page 21, last paragraph to page 22, lines 1-14 of the appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

In response to argument (1) that strong evidence has been presented with regard to the unexpectedness of the backcross as the art believed that *Tripsacum* genetic material would be lost, there is no evidence in the specification that teaches that backcrossing a trigeneric plant with maize would lead to the loss of *Tripsacum* genetic material.

As stated above, backcrossing is well known and common in the art of plant breeding and is used to introgress desired alleles from a donor plant to a recurrent parent plant to improve said recurrent parent plant; therefore, it would have been

obvious to one of ordinary skill in the art to backcross the claimed trigeneric plant with a maize plant because the trigeneric plant was produced by crossing maize-*Tripsacum*-teosinte and the specification teaches that *Tripsacum* can be used to transfer its germplasm into maize to provide beneficial traits such as heat and drought tolerance and resistance to corn root worm, as discussed above.

In response to argument (2) that the art could not have predicted the surprising number of novel alleles created by the crosses because rather than inheriting an allele from each parent as expected under Mendelian inheritance, the claimed plants have novel alleles formed at precise genetic loci via a recombination of the parental genomes, the plant taught by Eubanks (1994) would obviously have the same or similar restrictions fragments associated with its genome because the trigeneric plants taught by Eubanks (1994) have the same three parents in its cross (i.e. maize, teosinte and Tripsacum) as the claimed invention and one of ordinary skill in the art would have had an expectation of success based on the success of Eubanks (1997) in screening maize plants for the presence of one or more restriction fragments used to characterize Tripsacum x teosinte hybrids.

In response to argument (3) that the Examiner has not provided any evidence showing that one of ordinary skill in the art could have reasonably predicted the claimed restriction fragments, the restriction enzymes used to produce the claimed restriction fragments are widely used in the art and it would have been obvious to one of ordinary

skill in the art to use these restriction enzymes to produce restriction fragments. As discussed above, Eubanks (1997) teaches one or more restriction fragments. See, for example, page 708, 2nd column, 1st full paragraph where it teaches "[m]apping experiments combining…QTLs and molecular marker loci…have identified over 50 restriction fragment length polymorphisms (RFLPs) that distinguish advanced maize from its putative ancestor, annual teosinte". See, page 708, 2nd column, Materials and methods' where it teaches the digestion of genomic DNA with restriction endonucleases *Eco*RI, *Hind*III, *Eco*RV and *Bam*HI. Also, see, for example, page 709, Table 1 where it teaches markers used to characterize Tripsacum x teosinte hybrids.

Thus, the trigeneric plants taught by Eubanks (1994) would obviously have the same or similar restrictions fragments associated with its genome because the trigeneric plants taught by Eubanks (1994) have the same three parents in its cross (i.e. maize, teosinte and Tripsacum) as the claimed invention and one of ordinary skill in the art would have had an expectation of success based on the success of Eubanks (1997) in screening maize plants for the presence of one or more restriction fragments used to characterize Tripsacum x teosinte hybrids.

e. Conclusion

Appellant argues that the Examiner has pieced together the invention by providing citations that allegedly teach the claim elements without identifying a sufficient reason that would have prompted one of ordinary skill in the art to combine the

references to arrive at the claimed invention with reasonable expectation of success. See page 22, last paragraph of appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

The Examiner has provided sufficient reasoning as to why it would have been obvious to one of ordinary skill in the art to use the combined references to arrive at the claimed invention in the above responses to Appellant's arguments.

Claims 44-70 are Nonobvious Over the '977 Patent and Eubanks, *supra*

a. Scope and content of the prior art.

Appellant states that the claimed invention is directed toward a hybrid maize plant obtained by backcrossing a trigeneric plant to one of its parental strains, such that the hybrid maize plant has at least one of the recited restriction fragments; however, Appellant does not make any arguments as to why the combined references cited by the Examiner are not obvious over the claimed invention. See page 23, 3rd paragraph of the appeal brief.

It is noted that the claimed invention is not drawn to a hybrid maize plant but rather a maize plant comprising one or more restriction fragments wherein said maize plant was produced by crossing a maize plant with a (*Tripsacum* x teosinte) plant to produce a trigeneric hybrid maize plant and backcrossing said trigeneric hybrid maize plant at least once to a maize plant.

As discussed above under 'Grounds of Rejection', Eubanks (1992) teaches a maize plant produced by crossing a maize plant with a (teosinte x Tripsacum) plant and backcrossing the teosinte x Tripsacum plant to maize. One of ordinary skill would have understood that trigeneric plants can be used to backcross to maize because Eubanks (1992) teaches, "Tripsacorn evidently provides a natural bridge for introducing Tripsacum germ plasm into corn". See column 2, lines 14-21. It is known in the art that backcrossing is used to introgress desired genes into a recurrent parent wherein said recurrent parent would retain its own desirable characteristics in addition to having the desired characteristics of the donor parent.

In addition, Eubanks (1997) teaches one or more restriction fragments, as discussed above. Thus, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of Applicant's invention to combine the above teachings to produce the claimed invention.

b. Differences between the prior art and the claims at issue.

Appellant argues that Eubanks (1992) describes creating an intergeneric plant by crossing a *Tripsacum* female parent with a maize male parent and does not describe backcrossing a trigeneric plant to a maize or *Tripsacum*-teosinte hybrid. See page 24, 1st and 2nd paragraphs of the appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

Eubanks (1992) teaches crossing a maize plant with a (teosinte x Tripsacum) plant. See for example, column 2, lines 14-20, where it teaches "Tripsacorn evidently provides a natural bridge for introducing Tripsacum germ plasm into corn…[t]he results of crossing Tripsacorn…to corn were distinctly different from the results of crossing the patented plant Sun Dance…to corn". See, for example, column 2, lines 25-31 where it teaches, "plants grown from Tripsacorn x corn [it is noted that Tripsacorn was produced by crossing teosinte x Tripsacum, see column 1, lines 21-28] were sturdy, more tolerant of the drought conditions during the summer".

One of ordinary skill in the art would understand that this teaches that maize can be crossed with Tripsacum x teosinte plants because as discussed above Tripsacorn is produce from a cross from Tripsacum x teosinte. In addition, Eubanks (1992) teaches backcrossing. See, for example, column 2, lines 9-11, where it teaches "[i]n preliminary field trials of backcrosses to a commercial corn line, drought tolerance and enhanced pest resistance were observed in the F1 generation". Thus, it would have been obvious to one of ordinary skill in the art that backcrossing can be used to introgress different alleles into maize.

See MPEP 2141(II) (C) where it states, "A person of ordinary skill in the art is also a person of ordinary creativity, not an automaton."KSR, 550 U.S. at ___, 82 USPQ2d at 1397…Office personnel may also take into account "the inferences and creative steps that a person of ordinary skill in the art would employ."Id. at ___, 82 USPQ2d at 1396". Therefore, it would not have been beyond the skill of one of ordinary

skill in the art to backcross trigeneric plants with maize because said trigeneric plants would possess desirable alleles that would improve maize plants.

d. Relevant secondary considerations.

Appellant argues that (1) strong evidence has been presented with regard to the unexpectedness of the backcross as the art believed that *Tripsacum* genetic material would be lost; (2) the art could not have predicted the surprising number of novel alleles created by the crosses because rather than inheriting an allele from each parent as expected under Mendelian inheritance, the claimed plants have novel alleles formed at precise genetic loci via a recombination of the parental genomes; and (3) the Examiner has not provided any evidence showing that one of ordinary skill in the art could have reasonably predicted the claimed restriction fragments. See page 25, 1st paragraph of the appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

In response to argument (1) that strong evidence has been presented with regard to the unexpectedness of the backcross as the art believed that *Tripsacum* genetic material would be lost, there is no evidence in the specification that teaches that backcrossing a trigeneric plant with maize would lead to the loss of *Tripsacum* genetic material.

As stated above, backcrossing is well known and common in the art of plant breeding and is used to introgress desired alleles from a donor plant to a recurrent parent plant to improve said recurrent parent plant; therefore, it would have been obvious to one of ordinary skill in the art to backcross the claimed trigeneric plant with a maize plant because the trigeneric plant was produced by crossing maize-*Tripsacum*-teosinte and the specification teaches that *Tripsacum* can be used to transfer its germplasm into maize to provide beneficial traits such as heat and drought tolerance and resistance to corn root worm, as discussed above.

In response to argument (2) that the art could not have predicted the surprising number of novel alleles created by the crosses because rather than inheriting an allele from each parent as expected under Mendelian inheritance, the claimed plants have novel alleles formed at precise genetic loci via a recombination of the parental genomes, the plant taught by Eubanks (1992) would obviously have the same or similar restrictions fragments associated with its genome because the trigeneric plants taught by Eubanks (1992) have the same three parents in its cross (i.e. maize, teosinte and Tripsacum) as the claimed invention and one of ordinary skill in the art would have had an expectation of success based on the success of Eubanks (1997) using restriction fragments to characterize Tripsacum x teosinte hybrids.

In response to argument (3) that the Examiner has not provided any evidence showing that one of ordinary skill in the art could have reasonably predicted the claimed

restriction fragments, the restriction enzymes used to produce the claimed restriction fragments are widely used in the art and it would have been obvious to one of ordinary skill in the art to use these restriction enzymes to produce restriction fragments. As discussed above, Eubanks (1997) teaches one or more restriction fragments. See, for example, page 708, 2nd column, 1st full paragraph where it teaches "[m]apping experiments combining…QTLs and molecular marker loci…have identified over 50 restriction fragment length polymorphisms (RFLPs) that distinguish advanced maize from its putative ancestor, annual teosinte". See, page 708, 2nd column, Materials and methods' where it teaches the digestion of genomic DNA with restriction endonucleases *Eco*RI, *Hind*III, *Eco*RV and *Bam*HI. Also, see, for example, page 709, Table 1 where it teaches markers used to characterize Tripsacum x teosinte hybrids.

Thus, the trigeneric plants taught by Eubanks (1992) would obviously have the same or similar restrictions fragments associated with its genome because the trigeneric plants taught by Eubanks (1992) have the same three parents in its cross (i.e. maize, teosinte and Tripsacum) as the claimed invention and one of ordinary skill in the art would have had an expectation of success based on the success of Eubanks (1997) in using one or more restriction fragments to characterize Tripsacum x teosinte hybrids.

e. Conclusion

Appellant argues that the Examiner has pieced together the invention by providing citations that allegedly teach the claim elements without identifying a sufficient

reason that would have prompted one of ordinary skill in the art to combine the references to arrive at the claimed invention with reasonable expectation of success. See page 25, last paragraph to page 26, line 2 of appeal brief.

Appellant's arguments were fully considered but were deemed unpersuasive.

The Examiner has provided sufficient reasoning as to why it would have been obvious to one of ordinary skill in the art to use the combined references to arrive at the claimed invention in the above responses to Appellant's arguments.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Keith O. Robinson

Conferees:

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